LANTERN LECTURE ON NEW DISCOVERIES, 15TH AND 17TH MAY, *see p.* 32.

ANCIENT EGYPT

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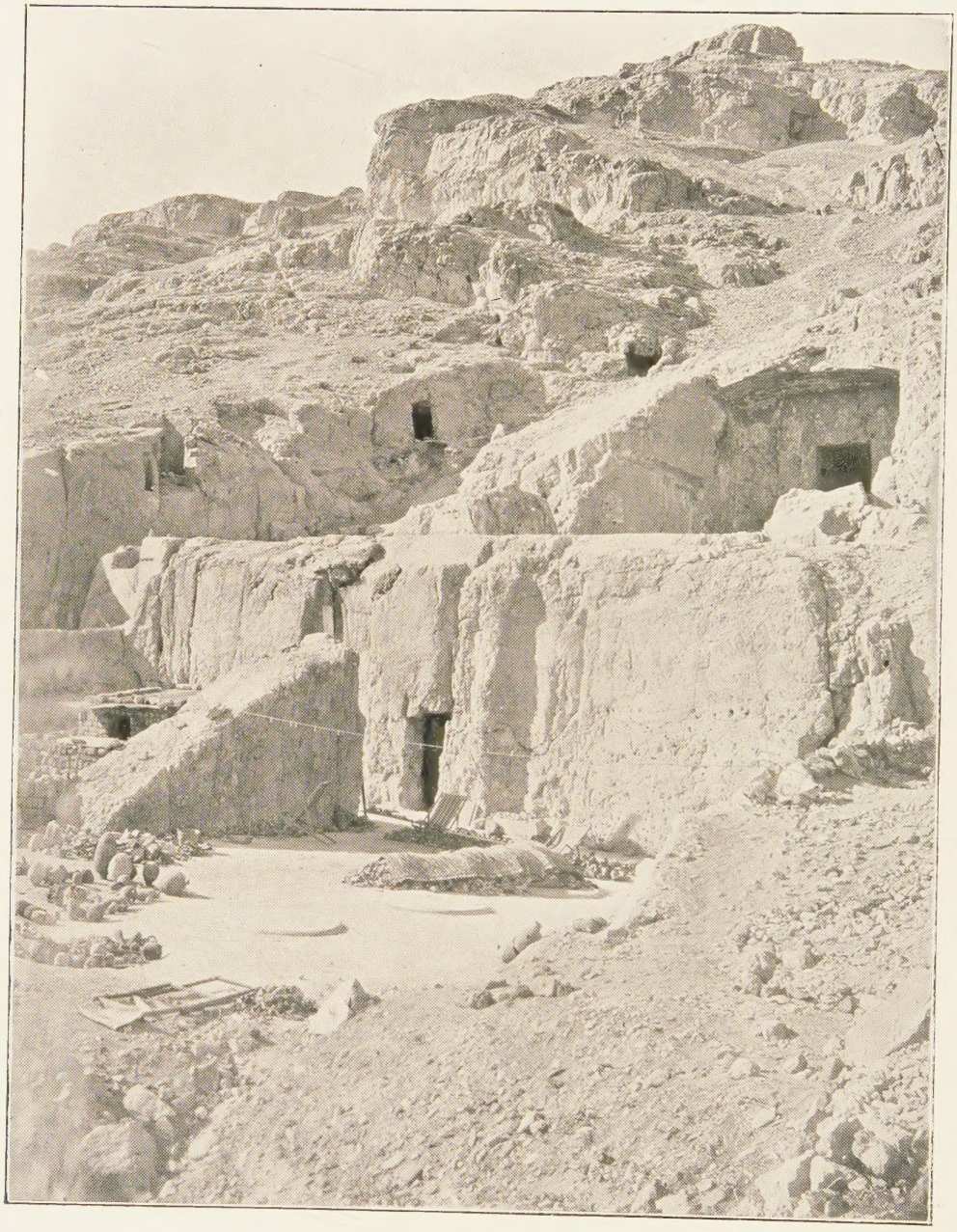


THE TOMB OF UAHKA, QAU EL KEBIR.

ANCIENT EGYPT.

THE ATLAS OF THE EMPIRE OF SARGON OF AKKAD.

THERE have been so many references to the geographical tablet of Sargon of Akkad (B.C. 2750), found at Assur, and its important bearing on the early history of bronze, that non-Assyriological students would, I believe, be glad to have a translation of it in their hands. The text has been published in *Keilschrifttexte aus Assur, verschiedenen Inhalts* (1920), No. 92. Only the obverse of the tablet has been preserved, and much of this has been injured or lost. Moreover, the text itself is a late Assyrian copy of an older Babylonian original, and was made by a pupil in " the school of the scribes " who was evidently learning the classical geography of the day, the result being that he has committed several mistakes in his copy, and in one passage has misplaced half a line. The original had been drawn up officially in the reign of the great Babylonian conqueror, Sargon I, and gave the mileage of the high roads of his empire in *bêri*.

1. " [Description] of the 17 high roads [of the kingdom] whose frontier is the country of Melukhkha.
2. [From the northern frontier, via] the Cedar-land (Mount Amanus) and the land of Khanû (now Dêr ez-Zôr on the Euphrates) ; 7 kings
3. [were conquered there ;] to (the southern frontier) Anzanzan, the whole of it is his (*i.e.*, Sargon's) territory . . .

---

4. [The produce of the mines in] talents and the produce of the fields to Sargon
5. [has been brought] ; in the upper region is he lord, in the lower region is he lord of them.

---

6. [From the western road] on the bank of the Euphrates, the countries of Zubri and Mari
7. . . . . [the country of] Yabusê, the country of Rapiqu,
8. [the kingdom ?] of . . . gan (?) the King of Assyria,
9. . . . . the rivers Tigris and Euphrates,
10. [from . . .] khâ to Lubdi is the land of Arrapkha (Arrapachitis),
11. the high-road of the Upper and Lower Zab ;
12. from the city of Nakhuzibê is the land of Lullubî ;
13. from . . . to . . na . . . is the land of Armanî (the Aramaeans) ;
14. from the *kh* (?) *izzat* (watch tower ?) to the gate of Akkad,
15. from the gate to Khallaba is the land of Gutium (Kurdistan) ;
16. from Khallaba to the . . of the city Mi . . nî is the land of Riqqu ;
17. from Surpu (conflagration or rainy land ?) to the ford is the country of Dur-ili ;
18. from the ford to the Forecourt is the country of Lagas (Tello) ;
19. from the . . . to the sea are the men of . . umta ;
20. from . . pa to Mangizu is the land of Erim (the Sea-land) ;

21. from the *khisat* (embankment ?) to the Euphrates is the country of [Ak]kad ;
22. from Tirgan of Gutium to Uzar of Ilulu is the land of Edamaruz ;
23. from Uzar of Ilulu to Bit-Sin (Harran) is the land of Marî ;
24. [from] Bit-Sin to Maskan-Sabri (Seat of the Steward) is the land of Malgî ;
25. from the city of Sargon to the Water of [the Ulai] is the land of Emutbalum ;
26. from Bit- . . ba to Rakhabut . . . . . ;
27. from Bit-DU-GAL to Eriyaba is [the land of . . . .] ;
28. from Dhurgu to the Mountain River is the land of . . . bal.
29. From the gate of Talbis[1] to the Plain (Padan-Aram) is the land of the Amorites[2], whose frontiers are Bit-Sin (Harran) and Sumer ;
30. 120 *bêri* is the length (of the road) from the storage-lake of the Euphrates to the frontier of Melukhkha and Bit-Sin (Harran),
31. 32. which Sargon the king of the world, when he explored[3] the land where the sky is low, a place of terror, measured as its high (*literally* broad) way.

---

33. 40 *bêri* is the length of the road in the country of Markhasi (Mer'ash) ;
34. 60 *bêri* is its length in the country of Tugris ;
35. 90 *bêri* is its length in the country of Elam ;
36. 180 *bêri* is its length in the country of Akkad (northern Babylonia) ;
37. 120 *bêri* is its length in the country of Subartu (Mesopotamia) ;
38. 120 *bêri* is its length in the country of Tirzi (Direction) from Labnanu (Lebanon) to Turukkî.
39. 90 *bêri* is its length in the country of Lullubî ;
40. 90 *bêri* is its length in the country of Anzanzan.
41. To the Tin-land (KUGA-KI) (and) Kaptara (Caphtor, Krete), countries beyond the Upper Sea (the Mediterranean),
42. Dilmun (and) Maganna, countries beyond the Lower Sea (the Persian Gulf),
43. and the countries from the rising to the setting of the sun
44. which Sargon the . . king conquered with his hand,
45. from Anzanzan to [Ma]rî, Zur . .[4], Zur-sasum,
46. Kullabi to . . . . . Lulubê, Maganna,
47. . . za, ... and the country of Udunî 'the Frontier' (Mizir) as the name [he appointed]."

. . . . . .

Melukhkha (1), "the Salt Desert," roughly corresponded to the Havilah of the Old Testament—that is to say, Northern Arabia.

Anzanzan (3), written Anzan in later documents, was southern Elam.

Zubri (6), written Supri and Subria in later texts, was on the eastern bank of the Euphrates, opposite Diarbekir. But perhaps the city of Supri, near Mari, but on the opposite (eastern) bank of the river, is meant.

Mari was the capital of Khana, and is now represented by Tell 'Ishôra, near Dêr ez-Zôr, on the western bank of the Euphrates.

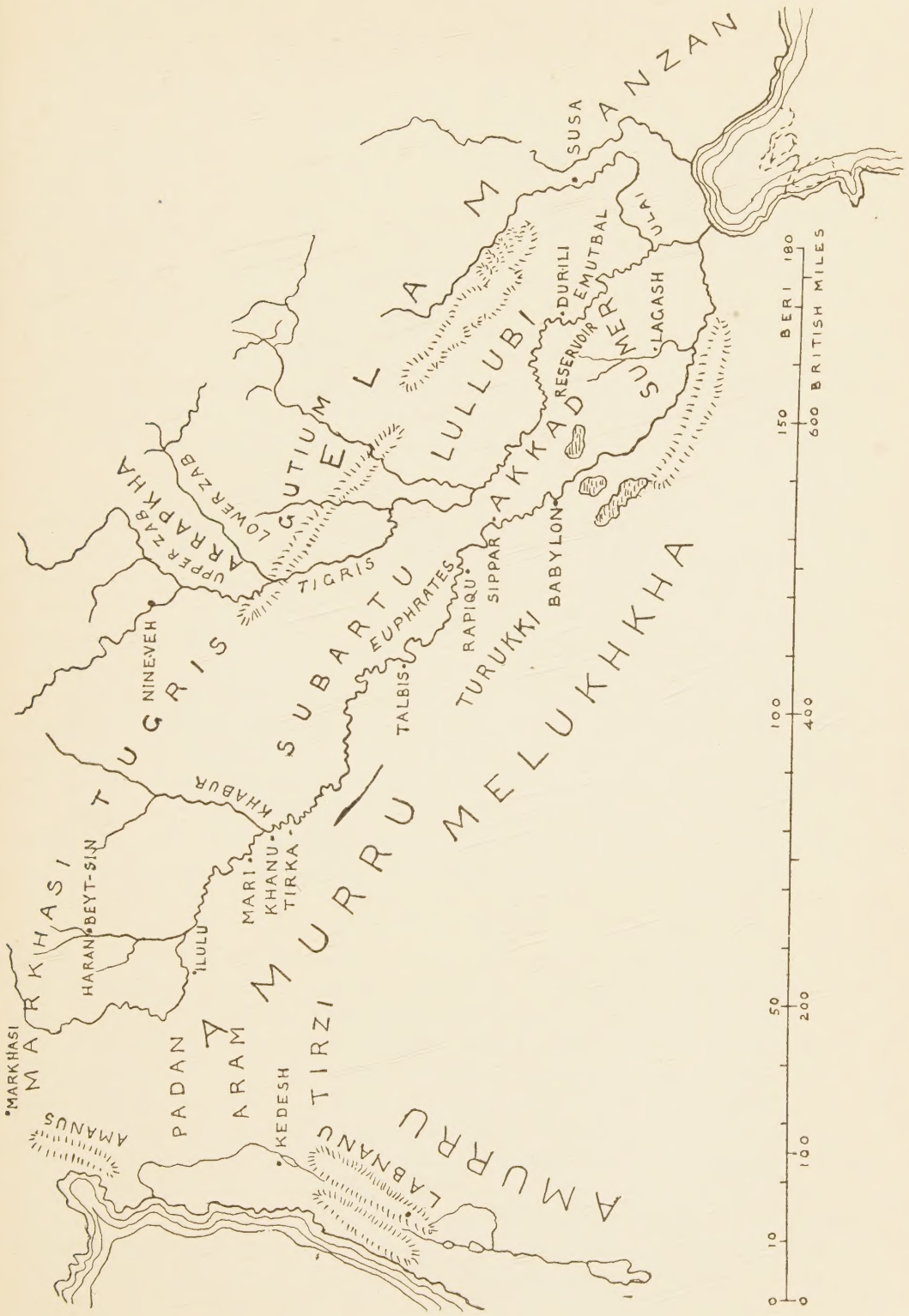
Rapiqu (7) was on the western bank of the Euphrates, south of Hit, and in a line westward of Bagdad.

[1] Talbesh. The scribe (or modern copyist?) has misread *sur* for *tal*.

[2] Read GIR-[GIR-KI] a synonym of "the Amorite land." Schröder reads *Gim-ti*, identifying the country with Ni-gim-khi which is coupled with Turukkî by the Assyrian king Hadad-nirari I. But the two names are obviously different.

[3] Or "took the road to" (*iqlip*), used of military scouting.

[4] Perhaps AMAR [-DA], Marad in Babylonia.


MARKHASI
MARKHASI
HARAN
BEYT-SIN
ILULU
MARI
KHANU-
TIRKA
KHABUR
NINEVEH
TIGRIS
SUBARTU
EUPHRATES
TALBIS
RAPIQU
SIPPAR
BABYLON
TURUKKI
AKKAD
RESERVOIR
DURILI
EMUTBAL
SUMER
LAGASH
ULAI
SUSA
ANZAN
ELAM
GUTIUM
LULLUBI
ARRAPKHA
UPPER ZAB
LOWER ZAB
MELUKHKHA
MURRU
AMURRU
PADAN ARAM
TIRZI
KEDESH
AMANUS
LABNANU
BERI
600 BRITISH MILES
0
10
50
100
150
180
0
100
200
400

Lullubî, Lulubî (12), was on the eastern side of the Tigris, in the neighbourhood of Serpul.

Dur-ili (17) was also on the eastern side of the Tigris, but in Babylonian territory, and was known also as Dêr.

Erim (20) signified "enemy" in Sumerian, but in the early days of Sumerian history the chief enemy was the people of the Sea-coast; hence the land of Erim became synonymous with "the Sea-land" (*W.A.I.*, v, 21, 43).

Talbis (29), now Talbes, was on an island of the Euphrates, a few miles south of Anah. The position assigned to the land of the Amorites is important, as it proves that it was identical with Mitanni, "the land of Midas." In Mitannian, Mitanni was called Murwu-khe, "the Murrian land" (the territorial suffix being that found in other Mitannian words—Kanis-kha, "the land of Kanis," Mukis-khe, "the land of Mukis," etc.), and consequently I am shown to have been right in maintaining that the name given to the Mitannians in the Hittite texts, which the German scholars read "Kharri," should be read "Murri." Mirrekh-nas, with the suffix *-nas*, "city of," is found in the Syrian geographical list of Thothmes III (No. 160), and Morrheus, "the Murrian," was a title of Sandes-Tarkus in Cilicia. The Amorites of the Egyptian monuments were a blonde people with blue eyes, and came from Asia Minor.

The storage-lake or reservoir of the Euphrates (30) is marked on an early Babylonian tourist's map as situated in what are now the marshes between the Shatt el-Hai and the Tigris (*see* my article in the *Expository Times*, November, 1906, pp. 68–73). In the map the reservoir is drawn like a bird's beak, and the city of Dur-ili is placed to the east of it.

The scribe must have omitted a line here, since Bit-Sin, "the Temple of the moon-god," was Harran, and had no connection with the land of Melukhkha. Perhaps the original text had: "and . . *bêri* from Bit-Sin to the northern country is the length of the road." In the "Tourists' Map" the extreme north, beyond Lake Van, is described as a "place where the sun is not visible," and in the Legend of Sargon, the Cappadocian Taurus mountains are stated to be "a place where the wind sleeps and the rains descend."

Markhasi (33) must be Mer'ash, and not the Elamite city which bore the same name in the later texts, since in the early age of Babylonia the latter place was known as Barakhsi.

Tugris (34) was the country at the source of the Khabur, and seems to have extended eastward to the Tigris, which has a name curiously like it. The early Assyrian king, Samas-Ramman, associates "the kings of Tugris" with "the king of the Upper Country," or northern Syria (*Keilschrifttexte aus Assur*, I, p. 3).

Turukkî (38), we may gather from an inscription of the Assyrian King Hadad-nirari I, represented Beduin tribes on the western side of the Euphrates.

"The Tin-land" (41) "beyond the Mediterranean" must be Spain, and so bears testimony to maritime trade at this early period between Asia and the western basin of the Mediterranean. It is unfortunate that the loss of the text on the reverse of the tablet prevents our knowing what the exact construction of the sentence was; but it would have been something like: "The road led towards the Tin-land" as well as other countries beyond the limits of the Babylonian empire.

The Babylonian city of Kullab, or Kullunu (Calneh), was the "lordship" of Lilla, the father of Gilgames.

Udunî (47) may be the Wedan of Ezekiel xxvii, 19, written Yadanana by Esar-haddon, who identifies it with Cyprus.

Mizir is the Babylonian word for "Frontier," and we may infer from this passage that its application in Babylonian to Egypt, whence the Assyrian Muzri and the Hebrew Mazor, Mizraim, originated in the fact that it constituted the frontier of Sargon's kingdom.

A. H. Sayce.

In order to follow more clearly this important document, I have drawn the map here given, which has been reviewed by Professor Sayce, so that it represents his results so far as he identifies the places named by Sargon. The most interesting matter is the length of the various countries and roads named. As an approximation, I have given a scale of *bêri* as equivalent to four miles each; the more exact value is discussed below. This scale will enable us to see what regions must be covered by the distances named.

In the first place, Markhasi, Mer'ash, was celebrated as the frontier to the N.W., the place from which distances were counted. The frontier between Haran and Melukhkha (l. 30) cannot have been far from Ilulu, and the "reservoir" is marked on the ancient Babylonian map near the Shatt el-Hai, where there is evidently a long fall, past Lagash to the Euphrates. The distance between these agrees to 120 *bêri*.

In l. 33–35 there is a continuous line of road from the frontier to Susa. The 40 *bêri* of the land of Markhasi leads to rather east of Haran.

The 60 *bêri* of the land of Tugris leads on to the mouth of the Lower Zab, where it comes through the hills. The 90 *bêri* of Elam reaches to Susa. This distance, having cities at the end, both of which must have been included in the lands named, gives a *minimum* value for the *bêru*; it must have been rather longer by the winding of roads; and it might have included some of the lands beyond the cities. The distance must have been at least 760 miles, for 190 *bêri*, or just 4 miles for the *bêru*, and probably 5 *per cent.* more, or 4·2 miles. The *bêru* is the phonetic reading of the ideographs KAS-GIB or KAS-PU, and under the latter name it is well known in metrology. It is reckoned as $(3 \times 2 \times 5 \times 12 \times 30) = 10{,}800$ cubits. The Assyrian cubit of 21·6 yields 233,280 inches, or the Persian cubit of 21·4 yields 231,120 inches for the parasang, but the above distances show 4 miles, or 253,440 as a *minimum*, and probably at least 266,112 inches. This is distinctly longer, and the round numbers of the *bêri* cannot account for the difference, as it would require 20 *bêri* more added to the distances. It seems, therefore, that the *bêru* must have been longer. Taking the length of 21·6, the Assyrian cubit, 12,000 such would be 259,200, or 4·09 miles, which would be a possible length. There does not seem to be a better explanation.

In l. 36, 180 *bêri* through Akkad must start from the N.W. frontier at Markhasi. 120 *bêri* through Subartu must start similarly. The 120 *bêri* from Lebanon through Tirzi brings Turukki to the place marked. The 90 *bêri* through Lullubi seems to start from the Khabur, as Lullubi cannot extend south of Durili, where Emutbal begins. Lastly, there is 90 *bêri* in Anzan or Anzanzan, from Susa down the east side of the Persian Gulf.

The Tin-land connected with Crete in the Mediterranean (l. 41) is difficult to understand. Tin was certainly not known as a separate metal in the West as early as the reign of Sargon. The site of Ilulu, in l. 22, has been placed on the map at the city Alalis of Ptolemy, though it would rather be east of the Khabur river by the connections in l. 22, 23.

Flinders Petrie.

EARLY COPPER AND ITS ALLOYS.

THE ordinary archaeological view of the greater age of bronze, in comparison with iron, has seemed a paradox hard to believe for me and other chemists and technologists.[1] Later modifications of that view have much reduced its difficulties. In the first place, metallic iron has been known for beads in prehistoric Egypt, though probably of meteoric origin, and never in common use as a characteristic of any period. Secondly, there has been a copper age preceding the use of bronze, in those countries where iron has followed bronze. Both of these results are illustrated in the Egyptian collection at University College, London.

In the prehistoric ages of North America, the large quantities of copper found there in a pure metallic state formed the material for tools and weapons, without any metallurgic or chemical process, and before the knowledge of any reduction of iron ores. Similarly in various parts of Europe, according to the statements of Much,[2] unalloyed copper has succeeded the use of stone, but probably reduced from sulphurous ores, or the oxidized products.

Even in Scandinavia, especially in Sweden, Montelius[3] refers to several discoveries of prehistoric implements of pure copper; he considers that this copper age is the close of the stone age, and that the metal was imported by trade routes from Germany and Austria. In Denmark there are proofs of an early copper age, and routes led to there from the copper mines of Central Europe.

As far as we can see, Norway is an exception in this respect. It seems to be entirely without any trace of a copper age.

I have had the opportunity of analysing samples from the very oldest discoveries of bronze made in Norway,[1] among these that at Aurland in Sogn, also a quite interesting piece of copper-looking metal found in an old stone-age residence at Ruskenesset,[4] near Fana, in Hordaland, but they were all real tin bronzes.

Possibly the cause of this may be that the western part of Norway, where these oldest bronzes were made, had its first communications abroad across the North Sea with Great Britain. Probably in those parts of England, where copper-ores with a content of tin have been worked, the bronze has been won by direct reduction, without fusing together the two component metals, quite in the same way as we have a lot of brass implements from antiquity, dating long before the zinc was discovered and isolated by Paracelsus in the sixteenth century.

I find support for this suggestion of mine in a remark by Mr. Coffey[5] that " only when it has been shown that the local ores (from which it may be presumed that the copper was obtained) are free from tin, does it seem allowable to argue that the tin has been added."

[1] *Cf.* my paper in Kristiania *Videnskaps Selskaps Forhandlinger*, 1922.

[2] Much, *Die Kupferzeit in Europa*, 2nd Aufl., Jena, 1893.

[3] *Svenska fornminnes föreningens Tidskrift* 18, Stockholm, 1891–93, pp. 203–238.

[4] H. Shetelig, *Norske Oldfund*, III, Kristiania, 1920.

[5] *A Guide to the Antiquities of the Bronze Age in the British Museum*, 2nd Ed., London, 1920, p. 5.

The prehistoric discoveries in Egypt and Mesopotamia are of peculiar interest in this respect. They seem to prove with certainty that in those countries, where the culture of the old world had its origin, pure copper, without any mixture of tin, is undoubtedly of greater age than the bronze.

The Cypriote copper, no doubt, is of a very great age. Some spearheads analysed in 1874, by Dr. Flight,[1] were shown to consist of almost pure copper—*i.e.*, with a content of 97·2–99·5 per cent. copper—the small quantities of other metals (without a trace of tin) being considered as adventitious impurities.

Later on M. Berthelot, especially, has called attention to the fact, in his analyses of antiquities, that many prehistoric, supposedly bronze, implements were real copper. In 1889[2] he showed that a very old statuette from Tello, in Mesopotamia, now in the Museum of the Louvre, consists of pure copper.

Of no less importance is the analysis, made at the same time by Berthelot, of that interesting cylinder in the British Museum, which was formerly called the sceptre of Pepy I, because it is shaped as the handle of a baton, and is provided with inscriptions of this king of the VIth dynasty. It was first described by Longperrier,[3] who suspected it to consist of bronze. Berthelot, who had got a small quantity of the substance for a chemical analysis, did not find any metal but copper, and a very dubious trace of lead.

This result may be doubted for several reasons. First, the quantity of substance that Berthelot disposed of was only 24 mgr., which is rather little for a complete analysis, especially as the substance was said to be oxidized. Moreover, there is a statue of King Pepy I in the Museum of Cairo which is certainly considered to consist of copper by both Maspero and Quibell. Nevertheless, an analysis made in 1907 of the material of this statue by Dr. Angelo Mossi, in Rome, showed that it was a real tin-bronze, containing 6·6 per cent. of tin. Meanwhile Dr. Hall, of the British Museum, kindly told me that there might be some doubt whether the fragment that has been analysed by Dr. Mossi was really a part of the said statue. Mr. Quibell confirms this in a letter to me, saying that most probably the analysis made by Dr. Mossi has no connection with the statue. We see that both the researches of Berthelot and of Mossi need to be renewed, but by reason of the archaeological value of the material there is no prospect of this being done.

Nevertheless, the odds are that Berthelot was right, and we may consider these two objects from the time of the VIth Egyptian dynasty to consist of pure copper. Certainly we have other analyses, both from Berthelot and from the late Dr. Gladstone, made on objects of about the same Egyptian age, or still older, which turned out to be real tin-bronzes ;[4] but on the other side there are a lot of analyses supporting the consideration of a copper age in early Egypt.

My desire to throw more light on this subject by increasing the supply of analyses has been kindly supported by British Egyptologists, to whom I am very much indebted for their indulgence : especially, Sir Flinders Petrie has been so very kind as to put at my disposal a large number of samples, mostly from the early Egyptian metal implements collected in his excavations of the old graves at Abydos, belonging to the Ist dynasty.

I got, in all, 29 samples drilled from the thick parts of tools, and most of them were brightly metallic, tough, flexible, and of a copper red colour. This was

[1] *Berichte d. deutschen chemischen Gesellschaft zu Berlin*, 1874, p. 1460.

[2] *Comptes rendus*, 1889.

[3] *Comptes rendus*, 1875.

[4] Mentioned by Prof. Flinders Petrie, Ancient Egypt, 1915, pp. 17–18.

especially the case with the samples 1 to 21, of which the composition is shown in Table I. They can practically be considered as consisting of pure metallic copper. None of them contained any tin, as they dissolved completely in nitric acid, with the exception of nos. 20 and 21, which left some sandy substance, but no stannic acid. The other metals, which we found present, are in such small quantities that we cannot consider that they were consciously put in as components of an alloy, but we have to consider them as accidental impurities due to the original ore. These accidental substances were mostly small quantities of iron, zinc or nickel, and once we found a trace of lead. Very often the samples contained arsenic, but never antimony. In some of these samples there seemed to be a very small and dubious trace of silver or bismuth, or both these metals. The solution of the metal in nitric acid gave, after dilution with water, a very weak white mistiness when hydrochloric acid was added, but the quantity was too small for further investigation. Most of the samples in Table I were, as already said, from the earliest dynastic times, but some of them were of later date, down to the XVIIIth dynasty: these, also, consisted of pure copper, without any tin.

TABLE I. BRIGHT METALLIC EXAMPLES, WITHOUT TIN.

No.	Object and date.	Reference.	Cu.	Fe.	Zn.	As.	Sn.	Ag. Bi.	Ni.	
1	*Axe, clean, Ist dynasty ...	T.W., III, 101 ...	97·99	...	...	...	...	...	...	...
2	Axe, green, Ist dynasty ...	T.W., III, 102 ...	98·13	...	·25	tr.	...	...	...	...
3	Axe, Ist dynasty	T.W., III, 104 ...	100·00	tr.	...	...	...	...	...	...
4	Axe, Zet, Ist dynasty	Abyd., 387 ...	99·61	...	...	...	...	...	...	...
5	Adze, Zet, Ist dynasty ...	Abyd., 387 ...	99·94	tr.	tr.	...	...	tr.	...	...
6	Chisel, Zet, Ist dynasty ...	Abyd., 387 ...	98·71	...	...	...	...	tr.	...	...
7	Chisel, Ist dynasty	Abyd., 388 ...	98·03	tr.	tr.	·25	...	tr.	...	...
8	Tip of knife, Ist dynasty ...	Abyd., 508 ...	98·50	...	·25	·6	...	...	...	...
9	Adze, Onkh-ka, Ist dynasty ...	Abyd., 510 ...	97·63	...	...	...	...	...	...	...
10	Axe, broken, Ist dynasty ...	Aybd., 601 ...	97·22	...	·34	...	...	...	tr.	...
11	Axe, Ist dynasty	Abyd., 615 ...	98·98	...	...	...	...	tr.	...	...
12	Adze, bird, Ist dynasty ...	Abyd., 640 ...	97·69	tr.	...	...	...	...	...	...
13	Chisel, Ist dynasty	Abyd., 640 ...	98·84	·63	·18	...	...	tr.	...	...
14	Axe, with lugs, Ist dynasty ...	Abyd., 654 ...	98·30	...	...	...	...	...	...	...
15	Adze, Ist dynasty	Abyd., 712 ...	99·60	...	...	...	...	tr.	...	...
16	Square bar, Ist dynasty ...	Abyd.	98·13	...	...	·15	...	...	...	...
17	Great adze, Ist dynasty ...	T.W., XVI, 66 ...	97·01	·50	...	...	...	...	·43	S, ·3.
18	Chisel, Khoskhemui, IInd dynasty	T.W., XXII, 49	97·70	·54	tr.	...	...	...	...	...
19	Adze, Abydos, VIth dynasty ...	...	98·00	tr.	tr.	tr.	...	...	...	Pb. tr.
20	Mason's chisel, Kahun, XIIth dynasty	T.W., XXII, 78	97·63	1·18	..	...	...	...	...	1·4 sand
21	Heavy chisel, Ahmes, XVIIIth dynasty	T.W., XXII, 68	98·53	tr.	...	...	...	...	...	·3 sand

TABLE II. VERY RUSTY SAMPLES, WITHOUT TIN.

22	Curved bar, Ist dynasty ...	Abyd., 720 ...	88·04	·14	...	...	...	...	...	7·96 sand.
23	Adze, very hard, Ist dynasty ...	Abyd., 420 ...	94·21	2·5	...	...	...	...	...	·42 sand.
24	Adze, very hard, XXth dynasty (?)	T.W., XVII, 92...	57·97	...	...	...	...	...	...	20·0 sand.

TABLE III. SAMPLES CONTAINING TIN.

25	Syrian axe, XIIth dynasty ...	Abyd., 51 ...	85·92	...	...	...	12·12	...	...	Pb ·77.
26	Mason's chisel, inscribed ...	T.W., XXII, 80	93·57	...	...	·50	7·44	...	...	Sb. tr.
27	Adze, Gurob, XVIIIth dynasty	T.W., XVII, 85	89·82	...	·36	·25	3·05	...	...	Sb. tr.
28	Large chisel, XVIIIth dynasty	T.W., XXII, 89	88·02	...	·25	·43	11·96	...	...	Pb. ·10, Sb. tr.
29	Winged adze, XIXth dynasty...	T.W., XVII, 93...	67·59	tr.	...	...	9·59	...	·60	...

T.W. refers to the plates in *Tools and Weapons* (Petrie) Catalogue of University College, in photographs. Abyd. refers to tomb numbers in *Tombs of the Courtiers* (Petrie) of the Ist dynasty at Abydos [in preparation]. In most of these analyses I was assisted by Mr. E. Söraas and Miss Nanna Isaachsen.

Three of the samples in Table I have been studied with X-ray spectrograms by Mr. Thomassen (see later on), with the following results, when the angles are referred to the line Cu β_1.

No. 3. (*T.W.*, III, 104.)

Lines.	Fe. Kα.	Fe. Kβ.	Cu. Kα.	Cu. Kβ.	Pb. Lα. As. Kα.	As. Kβ.
Measured	20° 6′	18° 10′	15° 52′	14° 17′	12° 1′	10° 49′
Calculated	20° 3′	18° 6′	15° 53′	14° 17′	12° 1′	10° 46′
Intensity	1	1	10	7	3	1

Besides the trace of iron, found by chemical analysis, some arsenic, and possibly small quantities of lead, are also found.

No. 16 (Square Bar, Abydos).

Lines.	Fe. Kα.	Mn. Kβ.	Fe. Kβ.	Ni. Kα.	Cu. Kα.	Zn. Kα.	Cu. Kβ.	Pb. Lα. As. Kα.	As. Kβ.	Pb. Lβ. Lβ_2.
Measured ...	20° 6′	19° 49′	18° 10′	17° 7′	15° 52′	14° 46′	14° 17′	12° 4′	10° 49′	10° 6′
Calculated ...	20° 3′	19° 45′	18° 6′	17° 6′	15° 53′	14° 46′	14° 17′	12° 1′	10° 46′	10° 1′ 10° 2′
Intensity ...	1	−1	−1	1	10	1	7	2	−1	−1

The chemical analysis is here supplemented by a trace of manganese, some nickel and lead. The zinc is disregarded (see later on).

No. 8 (Abydos, Ist Dynasty, 508).

Lines.	Fe. Kα.	Fe. Kβ.	Ni. Kα.	Cu. Kα.	Ni. Kβ.	Zn. Kα.	Cu. Kβ.	Pb. Lα. As. Kα.	As. Kβ.	Pb. Lβ. Lβ_2.
Measured ...	20° 6′	18° 10′	17° 8′	15° 53′	15° 23′	14° 46′	14° 17′	12° 4′	10° 46′	10° 3′
Calculated ...	20° 3′	18° 7′	17° 6′	15° 53′	15° 26′	14° 46′	14° 17′	12° 1′	10° 46′	10° 1′ 10° 2′
Intensity ...	2	1	1	10	1	1	7	5	3	1

Besides the zinc, arsenic and trace of iron found by chemical analysis, the spectrogram shows, too, the presence of small quantities of lead.

The three samples of Table II differ from those in Table I only by their being more thoroughly attacked by atmosphere and water, so that they were very much oxidized and rusty, and the contents of copper had essentially decreased; but they, too, are without any tin, and originally they have consisted of pure copper, in accord with their great age.

The five samples of which we give the composition in Table III behave in quite another way. They all belong to a later age, and they all contain tin in such quantity that we have to consider them as *real bronzes*. It will be of some importance, too, that for three of these samples, among the accessory impurities we were able to show the presence not only of arsenic, but also of antimony. It may be that this appearance of antimony is owing to the presence of tin, but it may be just as probable that it is connected with the special origin of the copper ore. Other analysts have also shown the presence of antimony in Egyptian bronzes from the later dynasties. This is mentioned by Flinders Petrie,[1] and he is inclined to consider Central Europe, especially Hungary, as the motherland for those bronzes in Egypt. This would well accord with the appearance of

[1] In his paper on the metals in Egypt, Ancient Egypt, 1915.

antimony (Fahlerz) in Hungary. In Bohemia and Saxony the same mineral appears, together with tin and copper ores. It would, then, seem probable that these bronzes are originally a European product, won directly from the ore, or else through fusing together the component metals, and that the completed alloy has been exported to Egypt.

Recently Sir Flinders Petrie drew my attention to the important source of antimony ores in Algiers. If these should really be considered as the origin of the antimony in Egyptian bronzes, we should be bound to assume its being intentionally put into the alloy, which I should think less probable in that time.

The oldest copper mines were, as is well known, in Sinai. Certainly the metal has been won there as early as the time of the Ist dynasty, and still earlier by the Semitic tribes living there, and brought from thence to Egypt. Later on, the Egyptians worked these mines themselves, and this continued till far into the XVIIIth dynasty, as certified by inscriptions on the rock walls of those times, where the copper is mentioned among the products which the military expeditions had to carry to Egypt. In an inscription as late as the time of Rameses III, of the XIXth dynasty (about 1034 B.C.), copper is not mentioned among the products from Arabia Petraea. We may, therefore, conclude that at that time the extraction of copper in this locality had stopped. At the same time we reach the end of the appearance of the pure copper implements, which were succeeded by real tin bronzes that have been imported from abroad.

The presence of arsenic, which we have found in most of the samples analysed by us, is in full accord with all accounts of the composition of the ores of Sinai. When, in 1822, Edv. Rüppel,[1] on the invitation of Mehemet Ali Pasha, made an investigation of those old mines, intending to work them again, he made on a small scale a reduction of a sample of the ore, and he mentioned that there appeared a strong smell of garlic, indicating the presence of arsenic.

It certainly should be of very great interest to get a complete analysis of the ore from Sinai. There might be some possibility of the accessory impurities of the ore showing some leading lines connecting the ore with the metallic implements originating from it. I made some endeavours to get a sample of that ore, but I regret that I have not succeeded, either through English or German museums or collections. Sir Flinders Petrie, however, has been kind enough to furnish me with a sample from the big heaps of slag of the old copper reduction found near Serabit, in Sinai. An analysis made in my laboratory of this slag gave 37·9 per cent. insoluble in acid, 21·65 per cent. copper, 37·95 per cent. lead, 1·9 per cent. iron, traces of nickel and cobalt, 0·45 per cent. arsenic, but no antimony, silver or bismuth.

I wanted to have a spectroscopic study of the sample, partly to have a control of our analysis, partly as a special investigation, to search for any rare metals, such as gallium or indium, that could serve as useful "leading" metals for the purpose mentioned above.

Professor V. M. Goldschmidt had the kindness to put at my disposal the X-ray spectrograph of the Mineralogical Institute of the University at Kristiania, and Mr. L. Thomassen has been kind enough to make some spectrograms for me of this sample, as also of some others mentioned in this paper. The result of the spectrographic research of the Sinai slag is given in Table IV, referring to the line Cu.β.

[1] *Reise in Nubien, Kordofan und das peträische Arabien*, Frankfurt, 1829.

TABLE IV.

Metal.	Pb.	As.	Pb.		Fe.	Fe.	Pb.	Cu.	Cu.	Pb.	As.	Pb.	Pb.
Line.	2 Lα.	2 Kα.	2 Lβ.	2 Lβ_2.	Kα.	Kβ.	2 Lγ.	Kα.	Kβ.	Lα.	Kα.	Lβ.	Lβ_2.
Angle— Measured ...	24° 37′		20° 33′		20° 4′	18° 8′	17° 16′	15° 52′	14° 17′	12° 1′		10° 3′	
Calculated...	24° 37′	24° 37′	20° 22′	20° 24′	20° 3′	18° 7′	17° 18′	15° 53′	14° 17′	12° 1′	12° 1′	10° 1′	10° 2′
Intensity ...	1		2		3	1	1	10	6	5		4	

We see that the spectrographic analysis has brought forward the presence of no rare metals ; taken all together, it confirms the ordinary chemical analysis, with exception of the traces of nickel and cobalt, which may be due to the heterogeneous nature of the material.

If we compare the composition of this Sinai-slag with the composition of the old implements of which we have made the analyses, we see a general accordance, as we have found small quantities of iron, arsenic and nickel in several of the implements : even a trace of lead we have found once by chemical analysis, and three times by X-ray spectrographic method (*cf.* above). We may well assume that the lead which has been present in the original ore, as an essential component, has mostly passed into the slag, and this may be assumed also for the cobalt, which certainly has only been a mere trace. With regard to the zinc which we sometimes found in the analysed objects, it was mostly in small quantities. On the other hand, Mr. Thomassen reports to us that X-ray spectrograms mostly show some lines for zinc, but they are not of much account, because they arise from small impurities of zinc contained in the copper of the anticathode, or they are due to a secondary radiance belonging to the brass mounting of the X-ray tube. On the other side we are inclined to lay some stress on the complete absence in the slag of any trace of silver or bismuth, of which we found some small traces in some of the analysed objects. Probably we here have an indication that already in those early times, when the unalloyed copper was commonly used in Egypt, the inhabitants got their copper not only from Sinai, but also from other parts of the world. The bismuth has, like the arsenic, a hardening influence upon the copper, and there are other analyses that show a content of bismuth up to 1 per cent. in the copper objects of the Ist dynasty. It is not very probable that those small quantities of arsenic or bismuth have been purposely put into the metal. We should rather think of them as accidental impurities, present in an original ore containing the said metals. It may be that we have to seek this ore in Cyprus, but it may be possible that it belongs to some other part of Europe or to Asia.

We now turn to mention some analyses of objects that we have got from Mesopotamia.

In the Ny-Carlsberg Glyptothek, Copenhagen, there is an old Sumerian statuette of about 3000 B.C., about the age of the old Egyptian copper objects mentioned above. This statuette consists of elaeolite, and has been described by Dr. Fredr. Poulsen, in the Danish Journal, *Tilskueren*.[1]

The head of the figure has been broken off, but has been put on again, and the break mended by a cement. But besides this restoration of a later age, there are placed round about in the head a lot of metal nails, mostly green and rusty. These, according to Dr. Poulsen, have nothing to do with the relatively modern

[1] Copenhagen, January, 1922.

application of cement, but he assumes that the statuette was splintered already in the old Sumerian age, and joined with the metallic nails. Dr. Poulsen was inclined to assume these nails to consist of copper, according to the analyses M. Berthelot had made of several antiquities belonging to the early Chaldean Age.[1] Dr. Poulsen had the kindness to put at my disposal one of these nails to try if his opinion was right or not.

Besides the nail itself, which was very rusty and green, but nevertheless mostly of metallic nature, I received a sample of some green patina-powder, wrapped up in a separate paper. It weighed 59·4 mgr., to which we added more patina scraped off from the nail, so that we had altogether 0·0852 gr. rusty patina powder.

For a first test this powder was treated with nitric acid, by which was left a rather considerable insoluble residue, which we supposed to be stannic acid. Further research on the insoluble part showed, however, that it all consisted of sandy particles, and there was no trace of stannic acid in it. The solution in the nitric acid contained, calculated in percentage of the patina, 67·02 per cent. copper, 2·50 per cent. iron, and only a trace of nickel, but no lead, silver, bismuth or zinc.

The opinion that the nail only consisted of copper without tin, for a moment had been put in doubt, but was quickly confirmed. We now took on the main analysis of the nail. It had a total weight of about 1·31 gr., and was cut in two parts, the one, A, weighing 0·608 gr., the other, B, weighing 0·7075 gr.

The piece A we tried to clean as much as possible by putting it for a very few moments in rather diluted hydrochloric acid, and afterwards washed it with distilled water and with alcohol. Then we tried to remove the remaining rusty spots with emery cloth, after which it was washed with water and alcohol, and perfectly dried. It had now a weight of 0·5765 gr. But, nevertheless, we did not succeed in getting a quite pure metallic and spotless surface. There was still remaining some rusty substance, which we did not dare to take away by more effective treatment with acid, for fear of losing small traces of tin that possibly might be present in the metal. The analysis was performed in the ordinary way by dissolving the substance in nitric acid. Even here there was some insoluble residue, which, however, appeared as light flocculents and flakes consisting of sulphur. The continued treatment with nitric acid mostly brought it all in solution, with exception of a very small quantity. This, however, did not contain any tin, the weight of it was 0·0019 gr., and it consisted mostly of some sandy matter with a trace of sulphate of lead.

The analysis of the solution gave 0·23 per cent. sulphur, 95·07 per cent. copper, 0·86 per cent. iron, 0·28 per cent. nickel, calculated upon the metal; no trace of bismuth, silver, zinc, or cobalt was found.

The piece B weighed 0·7075 gr. We first intended to take it for a special research for arsenic and antimony, and a controlling research for tin, by the method of Hartman,[2] which we have modified for our purpose, and used in the analyses of the Egyptian objects mentioned above. On further consideration, however, we found that it would be of still more interest to get an X-ray spectrogram of this substance. Mr. Thomassen had the kindness to make such an one

[1] *L'age du cuivre en Chaldée. Comptes rendus*, 1897, p. 328. *Sur quelques objets en cuivre, de date très-ancienne, provenant des fouilles de M. de Sarzec en Chaldée*, 1893, p. 161.

[2] *Zeitschrift für analytische Chemie*, 58, p. 148.

for us, and he gives the report of it included in the Table V, with the angles referred to the line Cu.β.

TABLE V.

Metallic Lines.	Fe. Kα.	Co. Kα.	Fe. Kβ.	Ni. Kα.	Cu. Kα.	Ni. Kβ.	Zn. Kα.	Cu. Kβ.	Pb. $L\alpha_1$. As. Kα.	As. Kβ.	Pb. $L\beta_1$. $L\beta_2$
Angles— Measured ...	20° 3′	18° 28′	18° 7′	17° 3′	15° 52′	15° 26′	14° 46′	14° 17′	12° 4′	10° 49′	10° 3′
Calculated ...	20° 3′	18° 28′	18° 6′	17° 6′	15° 53′	15° 26′	14° 46′	14° 17′	12° 1′	10° 46′	10° 1′
Intensity ...	6	1	3	2	10	−1	−1	6	3	2	1

Setting the zinc line aside (as before), we have here got a confirmation of our finding iron, nickel and lead, besides the copper ; further, the spectrogram shows the presence of cobalt and arsenic.

Regarding tin, the spectrographic method is not usually able to give any account, but the ordinary chemical research has convinced us fully as to the absence of tin, so that we really consider the metallic nail consisting of practically pure copper, and not bronze.

In later times we find implements of real bronze in Mesopotamia, as in other countries where the bronze age has succeeded the copper age.

A most interesting object of bronze we find in the famous bronze bands from the gates of the palace of King Shalmaneser II, which are in the British Museum. Through the kindness of Sir Ernest Wallis Budge, I was happy enough to get for analysis a fragment of these bands. It was a rather big piece, weighing about 15 gr. It was very rusty, and pierced by a big nail, presumably also of bronze. A preliminary analysis of the rusty substance showed the contents of 70·78 per cent. copper, 6·74 per cent. tin, 0·24 per cent. lead, the proportion between copper and tin being as 100 : 9·55. As a cleaning of the rusty metal, through treatment with acid, was quite excluded, we made a reduction of a part of the substance by heating it in a current of hydrogen. Hereby it lost 12·55 per cent. in weight, consisting of moisture, oxygen, carbonic dioxide, etc., and the analysis of the reduced metal now showed its composition : 90·0 per cent. copper, 8·75 per cent. tin (average of 8·88 and 8·63 per cent.), 0·41 per cent. lead, traces of iron, but no nickel, cobalt, zinc, silver or bismuth. In another sample analysed by the method of Hartman, slightly modified (see above), we found 0·12 per cent. arsenic, but no antimony.

The X-ray spectrogram, according to Mr. Thomassen, shows :—

Metals.	Fe.	Co.	Fe.	Ni.	Cu.	(Zn.)	Cu.	Pb. As.	Pb.	
Lines.	Kα.	Kα.	Kβ.	Kα.	Kα.	Kα.	Kβ.	$L\alpha_1$. Kα.	Lβ.	$L\beta_2$.
Angles— Found	20° 6′	18° 31′	18° 7′	17° 6′	15° 52′	14° 43′	14° 17′	12° 4′	12° 4′	
Calculated	20° 3′	18° 28′	18° 6′	17° 6′	15° 53′	14° 46′	14° 17′	12° 1′	12° 1′	12° 1′
Intensity...	3	1	1	1	10	1	6	1	−1	

If we put out of account the lines of zinc, the spectrogram, on the whole, gives a confirmation of the chemical analysis, with exception of the small quantities of nickel and cobalt, which our analysis had overlooked.

The metal in the said bronze bands from the Assyrian palace of about 850 B.C. no doubt is a real tin bronze of normal composition, similar to the bronze in the statues.

Regarding the question of the origin of the copper in the old copper and bronze objects of Mesopotamia, there is really no difficulty in assuming that it came from Sinai. According to Hilprecht,[1] several of the old metallic objects found in the ruins of Nippur and surrounding places have come from the country called Kimash (*i.e.*, Central Arabia, now Djebel-Shammar), or from Melukh (*i.e.*, North-west Arabia, up to Sinai). The intensive commercial connection existing between these parts of Arabia and the ancient Babylonia was confirmed about 2800 B.C. by the old priest-prince of Lagash, who reports, "from Kimash I get copper, and from the mountains of Melekh I get iron and gold."

But no doubt other copper sources were of importance for those old people of Mesopotamia. There are said to be several copper mines in the upper part of the Tigris, and near Pontus. My efforts to get some sample of copper ore from these countries were kindly met by the Prussian Geological Research, which sent me a sample of copper ore from an old mine near Arghana-Maden, in Kurdistan. It is said that the mine was worked in prehistoric times, and, from the antiquities found, it is concluded that the old Assyrians worked there. Moreover, it is said that even at the present time there is a small colony there of Greek miners, whose ancestors immigrated in early Hellenic times.

According to analyses made of this ore by the Prussian Geological Research, it contains from 3–12 per cent. of copper, mostly in the form of pyrites, as there is found also 33–42 per cent. of iron, and 20–35 per cent. of sulphur. Of other metals there are only traces of zinc, lead, and arsenic, and silicates of alumina, lime, and magnesia.

An X-ray spectrogram, made by Mr. Thomassen, is shown in the following table :—

Metal.	Mn.	Fe.	Mn.	Co.	Fe.	Co.	Cu.	Zn.	Cu.	Pb.	As.
Lines.	$K\alpha$.	$K\alpha$.	$K\beta$.	$K\alpha$.	$K\beta$.	$K\beta$.	$K\alpha$.	$K\alpha$.	$K\beta$.	$L\alpha$.	$K\alpha$.
Angles— Found ...	20° 51′	20° 6′	19° 48′	18° 28′	18° 8′	16° 39′	15° 52′	14° 46′	14° 17′	12° 4′	
Calculated ...	20° 31′	20° 3′	19° 45′	18° 28′	18° 6′	16° 39′	15° 53′	14° 46′	14° 17′	12° 1′	12° 1′
Intensity ...	2	8	1	3	5	1	10	1	7	1	

For this instance the presence of zinc, as of lead and arsenic, is confirmed by the ordinary chemical analysis. Moreover, the spectrogram shows appreciable quantities of cobalt, and small quantities of manganese, but neither nickel nor antimony.

It might seem tempting to seek a connection between the cobalt found in this ore and the cobalt contained in the two Mesopotamian metal objects mentioned above, but we must resist this, because we could not account for the presence of the nickel, which must have been derived from the original ore. We may assume

[1] O. Helm: *Chemische Untersuchung von altbabylonischen kupfer- und Bronzegegenständen, Verhandl. der Berliner Gesellsch. für Anthropologie, etc.*, 1901, pp. 157–164.

the connection between the Sinai ore and most of the ancient Egyptian copper objects, but it must be left to future investigations to detect the travels of the copper that was won out of the Kurdistan mine, and the origin of the copper in the Sumerian copper nails, as also of the copper in King Shalmaneser's bronze gates. We can only say that these objects certainly have no connection with the Kurdistan ore.

John Sebelien,
Professor of Chemistry.

Aas, Norway.

[This paper was communicated to the section of Anthropology of the British Association at Liverpool, 18 September, 1923.]

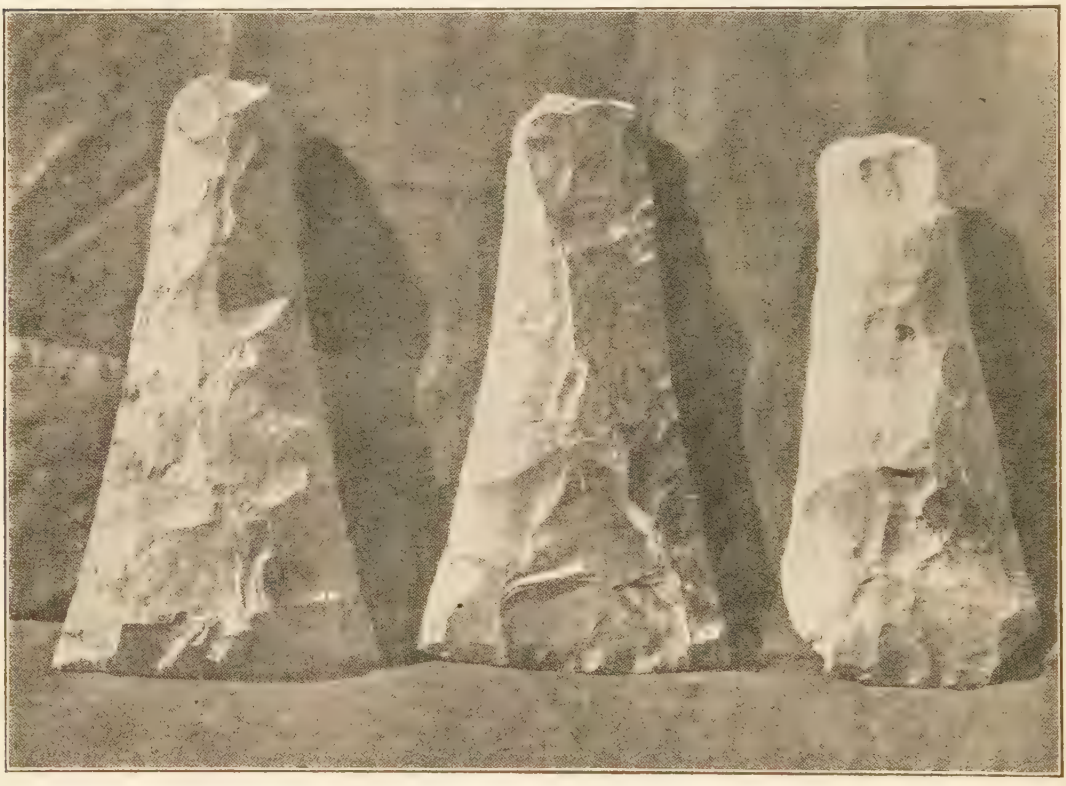
NOTES ON THE LAW OF ANTIQUITIES.

As the public cannot be expected to be familiar with the law on excavations in Egypt, it may be well, in view of recent events, to state the legal rights of excavators. Every holder of a permission must work the site granted to him during two months of each year, or else he forfeits his right of renewal for that site. Thus he has a right of holding a site year by year, so long as he obeys the law. Further, after two months in any season he may cease work, without forfeiting any of his rights of continuance. All publication is entirely in the hands of the excavator, so much so that after objects have been four years in the Cairo Museum unpublished, still no one is allowed to publish them without the excavator's permission. No person but the excavator has any right to view, or interfere with, the excavations or objects found, except the officials of the Department of Antiquities. Any other visit is solely at the discretion of the excavator. Such is the law and has been the custom during the last forty years.

THE BRITISH SCHOOL IN EGYPT.

Excavations at Qau.

The work which has been resumed this year at Qau has many kinds of interest, and, though it is not yet finished, we can already gain some view of the results. The questions that were pending about the great deposit of bones have been mostly cleared up. Another large deposit has been found containing specimens of all ages. There are the black and heavy bones, solid with lime and iron, and greatly rolled; the less altered bones which were washed out of local deposits and not rolled; the bones deposited fresh in the gravels, and little changed; lastly, the recent bones which the Egyptian piously buried along with those which



Large Hoes of Chert, Protodynastic, Qau.

he collected. By gathering the pebbles and sand found embedded in the cavities of the bones, we are able to identify the stratum in which they were deposited some 20,000 years ago. This gravel of igneous rocks has now been traced in various places in the wide bay of Qau, though we have not yet recovered the site where the Egyptians obtained the bones.

The purpose of the ancient collection of such remains is illustrated by finding them placed in each of the great tombs here. They were almost entirely the bones of the sacred animal of the district—the hippopotamus—and hence were collected and buried like those of other sacred animals; they were also placed in

the tombs to sanctify the burials—an early use of relics. Some more of the human bones have been found, parts of jaws, pieces of skulls, and limbs. From the extremely rolled state of a large proportion of the bones, it seems that their original site must have been near the Red Sea mountains, and that they travelled a long course in torrent beds down to the Nile.

Another site of the early rippled pottery has been found, and we have obtained some material which will show its relation to known periods. Of the historic times we have recovered an alabaster vase of the IInd dynasty, a great altar of granite of archaic type for the prince of Qau named Herui-nekht, alabaster vases of the Vth and VIth dynasties, groups of the amulets of that age and rather later, and many kohl pots of the XIIth to XVIIIth dynasties.

The frontispiece shows the position of the great tomb of the Prince Uahka of the IXth or Xth dynasty, with the cliff rising more than three hundred feet above it. In front is a wide terrace, which had a colonnade around it, and a sloping ascent to the tomb. The back of this court has three doorways, leading into a store chamber in the rock, fifty-seven feet long, which we divided into living rooms. The ascent was by steps up to the portico of two rows of columns, before the hall of pillars. Beyond that the rock contains the great hall, fifty-two feet long and thirty-one feet wide, hewn without any pillars.

An important part of the work this season is the complete copying of the remaining portions of the painted scenes in this tomb. Most of the painting has never been seen in modern times, being incrusted with dirt. By careful cleaning in various ways, much of it can be recovered, and the figures and inscriptions traced. The style, though based on that of the Old Kingdom, has many strange differences and surprising details. The whole work was magnificent—the rock-cutting of the great halls, and the delicate detail of the painting which covered the walls. There were originally about sixteen hundred square feet of painting in the great hall, and the ceiling, twenty feet from the ground, was covered with designs of mat-work, of which a dozen different patterns have been copied. The Greek design of palmetto and spirals is here carried back thousands of years. The whole place underwent miserable wreckage, but the remaining fragments give a high idea of the splendour of the southern kingdom in the Herakleopolitan age. The princes here seem to have held the country up to Aswan, and to have been the ancestors of the XIIth dynasty. Among the small objects, there are many more scarabs of the IXth dynasty period, and amulets rather older. A great variety of pottery, mostly belonging to the late Hyksos age, has been drawn.

Further north, the cemetery of Hamamieh has been finished, and Mr. Brunton's work now covers several cemeteries stretching about five miles farther to the north. The most important result is finding the remains of a brick temple, which appears to have been founded in the prehistoric age, and to have been rebuilt in the Old and Middle Kingdoms. A fine hawk figure of prehistoric work suggests that more of the sacred objects were there originally. Much of the prehistoric age, and early dynasties, lay hidden until now beneath the surface, which appeared to be entirely native desert; the ground was found to have been riddled with deep tombs, completely overlaid by later deposit.

FLINDERS PETRIE.

ASSYRIAN AND HITTITE SOCIETY.

We all remember the great interest which was excited some twenty years ago by the publication of the Code of Laws of Khammurabi. Lately two works have appeared which cannot rival the Babylonian Code in completeness, but which have provided over seventy Assyrian laws and nearly two hundred Hittite laws from fragmentary clay tablets of the codes. Père Scheil published the *Recueil de Lois Assyriennes* in 1921 ; a far greater triumph is Dr. Hrozny's wrestling with the scarcely-known Hittite language to restore the code, which, with assistance of the Czechoslovak government, has been issued as *Code Hittite* in 1922.

The value of law as a picture of society was illustrated in *Some Sources of Human History*, by comparing the codes of Khammurabi, of India, and of Wales The recent publications enable us now to compare together the laws of Babylonia in 2100 B.C., of Assyria in 1400–1200 B.C., and of the Hittites in 1300–1200 B.C. In regions so closely connected the resemblances and differences are of more precise interest than elsewhere. These comparisons are outlined in the present article, without at all exhausting the subject. For the preliminary settlement of prices, we also refer here to the obelisk of Manishtusu, father of Naram-Sin, about 2800 B.C. The laws of these countries have, moreover, another interest. The Hebrew origins in Babylonia—Ur of the Chaldees—and their racial connection with the Hittite type (pointed out by Dr. Salaman), show these laws to be the forerunners of the Hebrew legislation : it is in starting from such sources that we should study the changes found in the Pentateuch.

Before we can understand the penalties of the laws we must have some scale of values, as between labour, food, and current metals. The value of corn in 2800 B.C. was 1 shekel of silver per quarter. In 2100 a shepherd has 8, or an oxherd 6 quarters a year, and day labourers 5 to 6 shekels a year (by the day) ; so the price of corn remained about constant. If we take the prices before the Napoleonic wars, and again at the end of the last century, free of economic disturbance, wheat in England was worth 10 ozs. of silver for a quarter. Silver, therefore, was worth about 40 times its modern value in corn. At the present price of silver, the shekel of silver would be equal to 30*s.* now, and a century ago equal to 50*s.* We may here call it £2, to get a rough valuation. There are no corn values in the later codes.

Next, taking labour, in 2800 the slave cost 20 shekels (hereafter marked as S.). In 2100 the slave was 20 S., and compensation for a free man's life 30 or 60 S. The Hittite slave was from 10 to 25 S. The Hebrew valuation was 30 S. for a slave (Exodus xxi, 32), and 50 for a free man (Leviticus xxvii, 3 ; 2 Kings xv, 20). These rates are curiously uniform, and show that there was no serious change in values for 2,000 years. The hire of labour in 2100 was at 5 to 6 S. yearly, and among the Hittites 12 S. yearly. This would be in corn values about 5 to 10 shillings a week, just the range of Egyptian wages in recent times. The life value for a lower class man being about 40 to 50 S., and yearly pay 6 S., the life was reckoned about 7 or 8 years' labour. The price of a slave was only 3 or 4 years' labour, or 2 years' among the Hittites.

The Assyrian had no silver standard, but valued everything in a weight of lead. There are mentioned: a servant (high-class slave) at 4 talents; the compensation for seduction of a wife, her price 3½ talents; the penalty for abortion, 2 talents. These give, in comparison with other countries, 5 S., 8 S., or 5 S. for a talent, which would be equal to about £12 at present, or 3*s.* 6*d.* per lb. for lead. This is about 12 times present value, while silver was 40 or 50 times the present corn value.

The laws about animals open severely in 2100 with the penalty of death for all robbery. The Assyrian fine for stealing animals was ½ talent (or less), 50 blows, and a turn of corvée work. The Hittite had evidently much experience of cattle stealing, and had graded his laws minutely. For stealing a bull or a great horse or ram he had to give formerly 30, and later 15 such animals, of various ages from half a year to two years of age; for a plough ox he was fined 15, reduced to 10 oxen; for a cow, mare or sheep, 12, reduced to 6 animals. For stealing a common ox, horse, mule or ass, he paid double. For a fat pig or a goose the reduced penalty was 12 shekels, half the value of a slave; but less for young animals. The treatment of animals will be noticed after crimes of violence. Though the Hittite had many laws about stealing, he had scarcely any about dealing in stolen goods, such as Khammurabi lays down. Clearly the risk was cattle lifting to other estates, and not theft for sale.

The land laws in Babylonia, 2100 B.C., deal almost entirely with rented land, usually dividing the cost and produce between landlord and tenant. The holder was therefore bound to cultivate, and was responsible for all damage done to other lands by bursting of canals. In Assyria there is no trace of tenancy, and little among the Hittites, who only say that if A cultivates the land of B, and C take it from A, C may not cultivate it. The law in Assyria was mainly to check land grabbing. For shifting a boundary, the trespasser had to set back triple, a finger was cut, 50 blows given, and a month spent in the corvée. Shifting a water channel was a worse offence, and there was also a fine of a talent of lead and the beating was doubled. The Hittite was concerned about thefts by men employed in irrigation. If the man belonged to a corporation or Union, the whole body was responsible; but if a gang of men all stole, they were to be sent to prison. The laws had been let down: formerly if a man ploughed up another's crop and sowed differently, he was killed; but later he could be redeemed by a sheep, two sheep for his oxen, and a feast of loaves and beer. This law seems to show that they had the common-field system, so that there were no boundaries to fix rights in land.

Connected with the land, Babylonia had the system of fiefs, or tenure of land on condition of military service. The field, garden, and house of a feoffee could not be sold or assigned for debt, or bartered away; only such holdings as were bought could be dealt with. If the holder was absent, or neglected his tenure for three years, it was forfeit; but if away on duty, his son might manage it, if old enough. The fief could not be parted with to ransom the holder, if captured: his ransom must come from his own property, or the temple of his city, or, lastly, from the palace. There is no mention of fiefs in the remaining laws of Assyria. The Hittites had military fiefs well established. The service went with the land, however acquired from the original feoffee. A small field or holding did not matter, but any large fief was compulsory, unless it were a clear gift from the king, in which case it carried the right of maintenance from royal supplies. If the feoffee and his lieutenant quarrelled, the holding, men and supplies were divided as ⅔ and ⅓.

Many troops did no field service, as those of Manda, Sala, Tamalki, Khatra, Zalpa, Tashkhinia, Khemura, the archers, carvers, stable pages and men. But the men of Khattushash came to the king and claimed to be feoffees, and he told them to go and work their fiefs. The obligation to garrison-duty in expeditions, and levy for vintage, fell on smiths, and gardeners had to do all the field service. These details help to explain the military system of the Hittites.

The right to a field seems to have been accompanied by a religious service to consecrate the bounds, among the Hittites, like the Roman worship of Terminus at the boundary stones of all estates. A crop was cut off a given area of the land, and given to the priest, with a sheep, 10 loaves, and a jar of beer. This may be the act at the first enclosure of open land. On acquiring cultivated land, the new owner consecrated the bounds by offering fine flour to the sun goddess or the god Teshapash, and saying " my tree in the land thou hast planted."

Magic was strictly forbidden. In 2100 anyone weaving a spell and putting a ban on a man, without justification, was to be killed. Perhaps it might be done in self-defence. If an enchantment was put on a man, he had to plunge into the river, and unless he were drowned he could put the enchanter to death, and take his house. It seems to have been a sort of duel by ordeal of drowning. In Assyria, a man or woman practising magic was (after due proof) to be killed. Among the Hittites, a free man killing a serpent and naming another man, apparently to injure him, had to pay 60 shekels, or if a slave did so he was killed.

Marriage property and family laws naturally occupy a large space. Under Khammurabi (2100) the portion of a wife (from her father) is entirely for her children after her death. If she had no children, then her dower (from her husband) and her portion are each returned to the respective sources. Children of a second marriage divided the paternal house equally with the others, but the portion of each mother went to the respective children. If a widow had no fixed settlement, she held her portion, and shared like a son in the husband's property. A widow whose children were young could not re-marry without a judge's assent, and the whole of the first husband's property was tied by deed to the children and could not be sold. Gifts during a father's life did not enter into the sharing by his sons. A wife without marriage deeds had no rights.

The Assyrian provided for many cases. If a woman married without any deeds she was only bound after two years ; before that it seems as if she could withdraw. Women seem to have often lived in their father's house after marriage ; there are many references to such a position. A husband living in his father-in-law's house, if his wife dies, has the right to another daughter on the same dower. There is also a law dealing with the complication of a man marrying his brother's widow while he was already engaged to someone else, the dower being already paid over. Also if a woman lives with her father, even if she has never gone to her husband's house, yet she shares in all his expenses. When living with her father, she is supported by her husband, and she has no right to use the paternal property.

Widows were under very varying conditions. The dower of a widow, and any property from her father, was the property of her sons to divide. If she had no children it was hers altogether. If she still lived in her father's house, and had no children, the husband's brothers had claim on the dower. If the widow's father were dead, and she had no children, she could do as she liked. If she re-married, all her property became joint holding with that of her second husband. The sons by a first husband have no claim on a second husband. A wife abandoned for over five years, in her father's house, and childless, may re-marry. If a wife living with

her father is repudiated, the husband takes back his dower, but his gifts to her father remain. A repudiated wife has no claim on her husband. Khammurabi, however, ruled that 60 shekels of silver must be given if there was no portion to be returned.

The Hittite had few regulations about marriage property. If a wife died in her own house, the husband kept the dowry ; if in her father's house, the husband returned the dowry.

Affiance seems to have been a long and important period. The many references above to the wife living in her father's house shows that marriage did not make an inevitable break ; this agrees with it being less marked, and affiance being legally regulated. The Babylonian merely stated that presents to the girl's father, or a dower given, cannot be reclaimed if the man changes his mind ; but they must be returned if the father refuses to give the girl. The Assyrian law was more detailed. In no case could there be a return of perfumes and cakes. If a son died while engaged, the son's father could substitute another son ; but if there were none over ten years old, the girl's father had the choice of returning the gifts or taking a child ; if there were no other son, then all the permanent gifts must be returned, but not food. The Hittite dealt with other difficulties. If a girl, promised to A, chooses to marry B, she must return all A's gifts : the parents are not responsible. But if the parents made her marry B, then they must make the return. If, after the agreed price is paid by the man, the parents quarrel, then they must return double ; but if the man refuses to carry out the marriage he loses all his gifts.

Affinity is a bar to marriage, which varies vastly in different countries. There was but little restriction among Babylonians or Hittites, and the Assyrian laws never mention the subject among marriage regulations, but may be incomplete. Khammurabi penalised transgression with the mother by burning, with a married woman by drowning, with a daughter by expulsion, with a step-mother by disinheritance, with a betrothed girl by compensation ; but there do not seem to have been any limitations further. The Hittite recognised marriage with a widowed mother-in-law, sister-in-law, or daughter-in-law, or sharing a slave between father and son : they strictly prohibited only the direct line of descent, and married women. Unnatural crimes were punished with mutilation or death, as in Leviticus xx, 13, 15.

Slavery always complicates marriage laws. In Rome the free woman marrying a slave—who might be a highly educated Greek—lost her property and her freedom. There was no such hardship in the East. Khammurabi ruled that if a slave married a free girl, her children were free, and after the slave died, the woman took her own dowry, and the rest of his property was divided between her and the owner of the slave. When the marriage went the other way, if a man recognised his sons by a slave mother, they divided the property like all the rest of his family, and if he had not recognised them, at least they and their mother were free ; there was nothing like American slavery. From Assyria there is no law on the subject preserved. The Hittites had a just law. If a slave married a free girl, and paid a dower, no one could part them. Two employments were, however, looked on with disgust—a herdsman and a perfumer ; such need pay no dower, and their wives were to be slaves for three years. If a slave buy a slave wife, they cannot part. In such a marriage, or if a free man or woman marry a slave, then, if they quarrel, the woman takes one child, and the man takes all the others. This was probably to prevent burdening the woman with support of children.

Divorce was for various causes, but always for a defect in the wife, and seldom at the choice of the husband. In Babylonia, a wasteful wife could be called to account before authorities, and if the husband put her away, she left without anything; if he did not put her away, she stayed as servant to a second wife. A childless wife went away with all her dower and her portion; if she had no dower, her husband must give her 60 shekels, or 20 if poor. A wife put away for unnamed causes had all her property and her children, with due share of estate, and could re-marry. She might decline to continue her marriage, and, taking back her marriage portion, go to her father; but if she had also impoverished her husband, she was thrown in the river. If she were an invalid, she might either stay on with a second wife, or take her portion and return to her father. None of these causes are mentioned in Assyria, though they seem to have had much trouble with wives, as noted further on; but the settlement was severe. The Hittites only contemplated a man turning robber, in which case the wife had no remedy.

In such fighting races there were many cases of a man being captured abroad. If a Babylonian wife was left thus without support, she might marry again, but could be reclaimed. If she had means, she was bound to wait for her husband, under pain of drowning. The Assyrians compelled a wife to wait for two years, with public provision if she had no means, after which she might re-marry, but could be reclaimed. If she were in her father's house, she must wait for five years before re-marriage.

In Babylonia there were elaborate laws about adoption of sons, but there is no trace of that in either the Assyrian or Hittite laws. It seems therefore to have been a Sumerian custom. The Hittite women were prone to eject their sons in a tiff, by putting their clothes outside the house, and so repudiating them. If the son went back to get his bed and other goods, and the mother took them back, she had to restore her son.

The Assyrians had great trouble with the unruliness of the married women. Theft from the house, and gadding to friends, were severely punished. A woman taking and selling anything from a sick or dead man was to be killed, along with the buyer. If a slave or servant bought anything from a wife, the husband could not get it back unless he cut his wife's ears and the ears and nose of the receiver. If a wife stole from a house a value over five manas of lead, her husband had to restore it, and crop her ears; if he would not, then the owner of the goods cropped her nose. If anyone bought goods from a married woman with a hoard in the field, he was treated as a thief. This throws light on the habit of stealing and hoarding for sale. If anyone deals with a married woman, even without knowing that she is such, he has to pay two talents of lead. Anyone lending to a married woman was to be thrown into the river, but not bound; if he got out, he was further to be punished, as the husband punished the woman. Visiting was also stiffly punished. If a wife went often to see another woman in a distant house, without the owner knowing, he yet had to pay $3\frac{1}{2}$ talents of lead, and their ears were cropped. If he did know of it he had to pay triple, and if he disputed he was thrown into the river. If a husband found his wife with another man, he was at liberty to kill or mutilate them both. There was also trouble with quarrels. A scold or reviler was to be separated from her husband and children. If a woman struck a man she had to pay half a talent of lead, and suffered twenty blows. But if a man laid his hand on a woman he lost a finger, and if he kissed her his lower lip was cut off. If a woman joined in a fray (Deuteronomy xxv, 11) she lost a finger, or worse.

Thus there must have been a strong habit of thieving and violence among women in Assyria which is not found among either Hittites or Babylonians, and which is entirely opposite to the trading and freedom in business enjoyed by Egyptian women. A widow was not allowed to have her own house, but was obliged to live with a son. Young men were also kept in order, as any heir who spoke evil, or ran away, lost his inheritance to the king; if an heir killed any living person, the owner of the person might kill the heir, or else take his inheritance.

Slavery was strictly upheld. Khammurabi made it death to kidnap a slave, or to entice a slave from the palace, or to harbour one if he fled. A fugitive caught in the open country was to be returned for 2 shekels reward. If he would not give his master's name, he was to be sent to the palace, where no doubt it could be extracted. If a fugitive that was caught escaped, his captor must swear to the accident. There is scarcely anything on the subject in the remaining Assyrian laws, except that a servant was worth 4 talents, and a slave was priced differently (amount lost). The capture of a fugitive slave was worth 2 shekels on this side of the river, 3 S. if across the river, or 6 S. if gone to Luyya. If a fugitive was sheltered, the receiver had to pay a year's wages forfeit to the owner. There are also heavy penalties for taking a stolen Hittite to Luyya to sell, and *vice versa*.

A remarkable Hittite custom is shown by the law, that if a freeman at the New Year gave himself to a patron, the patron must discharge the freeman's obligations, or, if a slave, he must pay 10 shekels for him. This regulation at the New Year points to a custom like that of the Chinese discharging all debts at the end of the year. Finding himself hopelessly in debt, the Hittite debtor went to his chief creditor, and offered to become his slave in satisfaction; but then the debtor's other obligations must be discharged by his new master.

Assault was evidently a familiar failing, and all the codes have detailed fines assigned. In Babylonia an unintentional hurt in a quarrel, if sworn to be without malice, only involved paying the doctor; if it resulted in death, there was only a fine of 30 shekels, or 20 for a freed man. Yet there were much higher penalties for a deliberate blow: on the head of a superior it counted for 60 lashes, or an equal for 60 shekels; or a freed man striking a freed man, 10 S.; or a slave striking a freed man lost his ear. For permanent injury it was *lex talionis*, for eye, tooth, or bone: or on a freed man, 60 shekels; or for damaging a slave the penalty was half his value. For smiting a father, both hands were cut off. For assault and abortion of a free woman, 10 shekels, or if she die the man's daughter is to die. The Assyrian laws on assault are entirely about injuries to women; the section on general assault is probably lost. These laws are much like those above, but a woman causing her abortion was to be impaled for it.

The Hittite differed, in avoiding *lex talionis* and resorting to fines for assault, like the races of Northern Europe. For injuries the fines for wounding or knocking out teeth, formerly 60 S., were reduced to 20 S., or if a slave 10 S.; striking the head, so severely punished above, was only 3 S.; breaking hand or foot, 20 S., or of a slave 10 S.; breaking the nose, 60 S., or of a slave only 3 S., showing that it was mainly a penalty for disfigurement; splitting the nose, 12 S., or of a slave 3 S.; for abortion, 10 S. Killing was only to be compounded by supplying slaves, 4 for a freeman, 2 for a slave; wounding which resulted fatally was half of these terms. Chance killing in a fight was compounded for, by giving one slave. Merchants of the ruling races were highly protected by a fine of 100 manas = 6,000 shekels, if killed, probably because of the temptation to rob them when travelling.

From the immense fine, and the absence of any physical penalty, it seems that it cannot have been imposed on an individual, but was levied on a whole district, which was held responsible for such crimes committed in it.

Animals were scarcely regarded in the Babylonian code, only the hire and loss of them being regulated. In Assyria there is only recorded the penalty for stealing any animal, so much lead (half a talent or less), 50 blows, and some days of *corvée* service. The Hittite depended far more on animals, and made detailed laws. Those on direct theft are noticed above. If a young bull, horse or ram strayed, and was detained and raised, seven such animals of half a year to two years old had to be given. If it simply went into a wrong stable or park, it was merely reclaimed. Animals, when found, ought to be taken to the king's store, or, in the country, before witnesses; then there was no penalty. Stray animals need not be given up till evening. Hired cattle dying in fair usage only involved paying hire: but injuries were appraised up to 6 S. for loss of eye of horse or ox. If a wolf seized a sheep, and it was recovered, the captor had the hide and the owner got the flesh. If a pig trespassed, and died of blows, it must be given up to the owner. Dogs were well protected: the fine for killing a shepherd's dog was 20 S., the same as for a freed man; for a breeder's dog, as for a slave, 12 S., or for a common dog, 1 S. If a dog ate up lard, it might be killed without remedy. Bees were important, and were increasing in stock, as the theft of a hive of bees cost formerly 60 S., and was reduced to 5 S. An empty hive was valued at 3 S.

If lost property, in 2100 B.C., was found in possession of any one, he had to prove his purchase, and was allowed up to six months to find the witnesses. If he could not do so he was deemed a thief and was killed. On the other hand, the original owner also had to produce witnesses, and if they failed to identify it he had lied and, as stirring up strife, he was killed. If the seller of lost property has died, the buyer shall take five-fold of the claim from his house. In the Assyrian law nothing is preserved on the subject. The Hittite laws on cattle have been noted above, and if utensils were found, and were not returned to the owner, the finder went to prison. A curious law regulates that if a young animal (wild ?) has no mother, and is given into charge of anyone to keep, if it be chased and killed, compensation is due.

The Hittites had laws about burning buildings, due probably to their using wood in a mountainous region, and not mud brick as in Babylonia. A man who burnt a house had to rebuild it, but was not liable for the death of men or animals in it. If a slave burnt a house, his master must rebuild it or give up the slave, whose nose and ears were cut. If a man burnt a barn, he must rebuild it, and replace after harvest any crop that there was in it. If one burnt crops accidentally, he must give up an equal crop. If he burnt an orchard accidentally, he must replant it, and pay 6 S. for each tree, or if a slave, pay one half. Under Khammurabi if a man took aught from a house on fire, he was to be thrown into the fire.

Theft was common in all these countries. It was death in Babylonia to steal, or to receive stolen goods, belonging to a god, a temple, or a palace. Also to receive any property from a man's son or servant, without a witness. (The wives seem to have been better behaved than in Assyria.) Robbers and burglars were to be killed. Stealing cattle of a temple or palace was fined thirty-fold, or by a common man ten-fold: if he could not pay he was to be killed. If a robber could not be caught, the city and governor had to make good the loss, and pay to the family 60 S. for a murder. In Assyria, if anyone but the owner sold an

animal, the seller lost all the price. If any one hired a boy or girl to work, and then sold them, he lost the price, was beaten, and did 20 days *corvée*, or if sold to abroad then 40 days *corvée*. The Hittite fines for cattle lifting have been already stated. A freeman caght in a storehouse was fined 12 S., a slave half as much. If he stole, he must also replace the values ; or, if a slave, his master was responsible ; the fine used to be 60 S., but was reduced to 12 S., and, if a slave, his nose and ears were cut. Theft of fruit was fined 6 S., or from a slave 3 S. ; this shows how strict private property was in orchards and gardens, a position which had recently stiffened, as the fine used to be 1 S. Parallel to this is the heavy fine for carrying away palings ; for 70 lbs. weight of wood 3 S., and if one took a couple of hundredweight, he was given over to the king's justice. This shows excessive care of rights in land. For stealing an orchard, a shekel was to be paid for every ten apple trees, or for sixteen of other fruit trees. Some other fines cannot be interpreted, from our not knowing the units stated.

For stealing from a peasant, a freeman was fined 6 S., or a slave half of that. Stealing from the palace gate (*i.e.*, court of justice) was heavily fined ; to take a bronze lance was death ; for a wooden emblem, 6 S. ; for a copper figure, grain was paid ; for a cover of linen a piece of linen. If a door was stolen, thus leaving a house or garden open, the fine was heavy, 60 S. and replacing the door. For a carved stone, 2 S. must be given, an unwrought material was to be replaced by larger quantities. To steal a copper knife cost 6 S., or half that, if a slave. Underclothing stolen cost 10 S. Exemptions from taxes were enjoyed by the priests of Nerik, Arinna, and Ziplanda. Formerly, the weavers of these places were free, with their staff and relatives, but now only the weaver's house is free.

False accusation is scarcely mentioned by Khammurabi, only in one case the accuser is said to stir up strife, and therefore shall be put to death. The Assyrians, on the contrary, had many laws about it. A false accuser of a woman was to be bound, and thrown into the river ; but if the imputation was only in the heat of a quarrel, he had to pay a talent of lead, receive 50 blows, and do a month of *corvée*. The same penalty was due for what is now one of the commonest terms of abuse in the East, imputing infamy to a man ; the Assyrian would soon have decimated Egypt by his laws. There is no reference to false accusations in any of the Hittite laws that are known.

Personal pledge for debt was in the Babylonian system. If a man was seized for debt, and his wife or son or daughter was given to work off the debt, they could not be held for more than three years. If a slave was given for a debt, he might be sold by the creditor ; but if a slave-concubine, and the debtor redeemed her, she became free. The Assyrian decided that if a man or woman is in pledge for money, if the creditor shaved or cut them, he should be beaten and have his ears split. Also if a girl were in pledge she could not be married without father's or brother's consent, and a month's notice was allowed in order to redeem her. The Hittites were less commercial, and show no trace of personal pledges. Turning now to some laws which were peculiar to one country, the Assyrian was very particular about the veiling of women. All married women and their attendants must be veiled. Temple women were veiled if they married, but otherwise had the head bare. All slaves, concubines, and public women must go unveiled. If one was caught veiled, the arrestor on taking her to the palace gate, had the right to her garment, she was beaten fifty blows, and had asphalt poured on her head. If anyone saw her veiled, and did not denounce her, he had fifty blows, weapon and garment seized, ears cut, and one month of *corvée*. If a slave

went veiled, her ears were cut ; or if one did not denounce her, the penalty was as before. If a concubine was made a wife then she veiled, and the declaration must be made before five or six witnesses, before whom the man veiled her, saying, this is my wife.

For landed property that might be claimed, a public crier announced it at length three times within one month, calling on any one who had a claim to bring forward their deeds in proof. Then the crier, and the governors, the mayor and three chief elders all sat to hear the claims. If anyone exaggerated the price of anything, on conviction he was left to the mercy of the king's court. But if he had done so in writing, he was beaten and also his scribe.

The Hittites had also some special laws. If a man and his ox were crossing a river, and someone drove the ox and held on to his tail, should the owner be drowned, the driver got the ox. If a man (A) pushed another (B) into a fire, and he died, then A had to give up a son.

No one was allowed an appeal, or to contest a judgment. " If any one resisted the justice of the king, his whole household were killed ; if one resisted the justice of a dignitary, his head was cut off. If a slave rose against his master, into the great pot he went," whatever that might be.

A long list of prices was part of the Hittite code. Without going into all the details, the general results are as follow. The prices of grain and of labour have been noted at the beginning, in order to understand the shekel value, which was about equal in purchasing power to £2 now. Four manas (4½ lbs.), or 240 S. of copper was worth 1 S. of silver, so copper was at 9*s.* a pound, about twelve times modern value, like lead.

For the hire of a bronze dish of a mana weight, as much as a shekel a month was required. This seems an astonishing rate, four times the value of the metal for a month's hire, yet we cannot question it as the phrase is the same as that used of the undoubted hire of a beast. A smith for making a copper vessel was paid in grain about seven months' hire of a shepherd, probably about 7 S., worth about £15. This must have been for a very large cauldron, as for a flat dish, of a pound or two, he only had 1/14 S., or about 3 shillings.

For cattle, the prices were, for a plough ox 15 S., great ox 10 S., great cow 8 S. The hire for a year was a third of the value : Sheep, 1 S. ; goat, ⅔ S. ; lamb, ½ S. ; kid, ¼ S. ; draught horse, 20 S. ; great mule, 60 S. ; horse, 14 S. ; plough mare, 15 S. Foods were measured by the jar, called *zimittani*, which seems to be the Arabic *demejaneh*, which passed into English in the Middle Ages as demijohn, averaging 5 gallons. This early use strengthens the claim for derivation from Damaghan, S.E. of the Caspian ; if so, the site in Arcadia where such jars are made must have been named from the jar. This measure of good oil cost 2 S. ; and of lard, butter or honey, 1 S., which was also the price of 2 cheeses or 3 batches of leaven. Wine cost 1 S. for 14 gallons, or about 4½*d.* a pint, not far from the price of rough wine in Italy now.

For clothing, an undergarment, probably a heavy knitted wool vest, cost 30 S. ; a blue wool robe, 20 S. ; breeches, 10 S. ; a robe of sacrifice, probably a ceremonial scarf, 12 S. ; a band, 1 S. ; underclothing, 3 S. A large cloth cost 5 S. Skins were cheap, showing that they were not much worn. 1 S. was the price of an ox hide, or 5 calf skins of 6 months, or a sheep skin with wool, or 10 shorn skins, 4 goat skins with hair or 15 shorn, 20 lamb or kid skins.

Lastly, the aspect of each of these civilisations, as reflected in the laws, may be summed up. In Babylonia there are the products of a long-settled commercial

system. Land and animals were rented or hired. Dealing in stolen goods was more considered than actual stealing. There were laws as to beer licences, distraint, building, tenancy, pedlars, account-keeping and such matters which never need regulation in a simple order of life. There is hardly any reference to military matters, and the fiefs are those of officials and not of soldiers. There was a strict descent of property, and the requirement of written deeds. Though the law was very severe on wrongs, it was liberal toward rights, as when a divorced woman must have 60 S. given to her if she had no portion. Slavery was not disgraceful, as slaves might marry free women. A wife who was hopelessly invalided might either take her own portion and go to her family, or continue along with another wife. These laws are certainly protective. Adoption was frequent, and appears to be Sumerian in origin.

In Assyria there was a very different life. There is no reference to rent or hire or commerce; little about cattle, but severe penalties for land grabbing. There was much false accusation and reviling, showing a quarrelsome people. The unruliness of the women, and lack of home-sense is the prominent trait. This points to a large amount of outside marriages, like the modern Persian with Kurd and Georgian girls. These untameable beauties from less civilised tribes would naturally think of plundering a home rather than keeping it, and the "hoard in the field" is an idea that would be impossible to an Egyptian "mistress of the house." There was no divorce law, but only punishments of mutilation or death for misconduct. The particularity of veiling for married women and refusing it to all others agrees with this subjection of a barbarous and unruly element.

The Hittite system was different to both of the others. The agriculture was on the unenclosed common field; orchards were, however, carefully enclosed, and this was rather a new thing, as they had to be strictly protected, and the penalties for carrying off fencing were very severe. The ceremony of a fresh intake of land from the common waste, shows that much enclosure was going on at that time, as new boundaries had to be consecrated, probably to establish a legal title. The taking over of purchased land already in cultivation, was a much less formal matter. These laws, and the slight reference to renting, show that the country was then being gradually settled. There was a public levy of labour for the vintage, a trace of communal life. The land was largely held as fiefs, for which military service was due; the knight and his lieutenant with their followers lived on the estate, and had to cultivate it when not called out on duty. If they quarrelled, they were to divide it. There were also troops levied from other regions, who had no land basis, and who therefore constituted a standing army. The country was wooded, as shown by the laws about burning houses and barns, the Babylonian in his land of mud bricks was less concerned with this. The penalties for assault and injury were not the *lex talionis* of Babylonia; the country was too sparsely peopled to have cripples about, and fines were levied as among peoples of northern Europe. There were many laws about cattle-lifting, but none about trading in stolen goods; it was a land of farms rather than towns. The marriage laws had little to do with property, suggesting that it was kept in men's hands. The slave might marry the free woman, but two kinds of union were strongly disliked—that with a herdsman, probably because of his vagrant life on the pasture hills, and that with a "mixer of unguents" or perfumer, perhaps because he had opportunities for intrigue in households. No divorce is named in any law. Debt might be discharged by voluntary slavery. Merchandise was much encouraged, as merchants were protected by an enormous fine on killing

one, so large that it must have been levied on the district, and not on a single robber. There was no appeal from any legal decision, but capital punishment if it were disputed. The whole condition is much like that of Saxon England, with settlers in a wooded country having plenty of land around them, and much of it held on military tenure. From these laws, then, we gain a fuller view of the Hittite civilisation, which took so large a part as an intermediary between eastern and western peoples.

FLINDERS PETRIE.

INLAID FIGURE OF TUTANKHAMEN ON HIS THRONE ATTENDED BY THE HEIRESS-QUEEN ONKH-ES-EN-PA-ATEN.

INLAY OF COLOURED GLAZE AND GLASS ON THE BACK OF A THRONE.

REVIEWS.

The Tomb of Tut·ankh·amen. By HOWARD CARTER and A. C. MACE. 8vo. 223 pp., 80 plates. Vol. I. 1923. (Cassell.) 31*s.* 6*d.*

After all the rampant bookmaking linked on to this subject it is refreshing to read the simple and well-balanced record which is here set out by the explorers themselves. The volume opens with a short biography and appreciation of Lord Carnarvon, by his sister : such a tribute would be profaned by any outside comment. The first chapter deals with the history of the king's family, and then follow others with accounts of the Valley of the Kings. The interest thickens when the three remnants of the funeral of Tut.ankh.amen are described, found near together in the Valley, prompting the belief that his tomb must be near at hand. It is not blindfold scrambling, but the careful noting of little things which leads to great results. The foundation deposits outside the entrances of royal tombs are referred to in several instances, but have not yet been published. The history of the actual finding of the tomb is fully recorded in all its stages. The clearing of the contents of the antechamber is described, and the ancient ransacking and rough repacking of all the boxes. All of this is sufficiently full as a final account, leaving the ultimate publication of the objects clear of transient detail. Ten pages bewail the plague of visitors, shameless, heartless wasters of valuable time. Even one visitor in an excavation is a nuisance, expecting to take precedence in the attention which is really due to the workmen. The two hours of daylight, after everyone has gone back to Luxor dinners, would surely have sufficed for external work at the tomb, and internal work would be as well done by night as by day. It ought to have been possible to freeze off the tourist by dead silence. " Work in the Laboratory " is a long and valuable chapter, which should sink into the soul of anyone wishing to interrupt such labour. The need of being left undistracted in order to dive into the details, to reflect on the whole of a site, to reason out the meaning of everything and learn all the indications, is well insisted upon. In short, plainly, no one has any right to interrupt an excavator until he has finished his delicate and difficult operations ; all publicity, before things are safely housed in a museum, is an unjustifiable risk. It may be noted that " beads of dark resin " (p. 167) are probably amber ; drying papyri between glass (p. 161) is not so good as between packs of dry paper ; on Plate LVII there is, surely, the earliest instance of a true hinge. The volume closes with many photographs that have not yet been published, and brief descriptions. The whole account seems exactly fitted to the occasion, giving all that anyone can have a right to expect at this stage. After such strenuous and exhausting work we must thank the authors for setting the good example of publishing in the same year so full an account of what has been discovered. The figure placed opposite, and on the cover of this journal, is from one of the most interesting scenes ; the king's face appears here unduly sloping, owing to the curvature of the chair back.

Horus und Seth als Götterpaar. By HERMANN KEES. Part I, pp. 72. 8vo. (Mitteilungen der Vorderasiatisch-Aegyptischen Gesellschaft (E.V.) 1923, 1. Leipzig.

As a corrective to the view of the prehistoric supremacy of Lower Egypt, and the intrusion into Upper Egypt of a Lower Egypt Horus, Kees states that he has studied the temple scenes and the texts for: (1) the views held in historical times on Horus and Seth as representatives of the two realms; (2) the distribution of certain cults in Upper Egypt which fluctuated between Horus and Seth, or in which may be discerned the secondary interpretation of an older pair of gods; (3) the method by which theological speculation in the Pyramid Texts drew older combinations of gods into mythology; and (4) the essential qualities for the arranging of certain divinities into definite pairs.

The following points emphasised by Kees may be noted here: The author disagrees with Sethe's contention that *Bḥd.t* was originally a Lower Egypt cult place, and considers that Horus and Seth were both gods of Upper Egypt. The ignoring of Horus of *Bḥd.t* by the Pyramid Texts is inexplicable if he were a local Lower Egypt god, but readily intelligible if he were an Upper Egyptian divinity. The Pyramid Texts render the allegory of Horus and Seth in most varied forms: as personifications of heaven and earth, the upper and lower world, day and night, sun and moon, west and east. The conception of Horus as a sky god and Seth as the lord of storm contains elements older than the Heliopolitan system. Heliopolitan doctrine seems to have brought Seth as a storm god into relationship with the fight of Ra with the serpent Apophis, and to have made him the enemy of the sky god. Thus began his degradation to a principle of evil and the enemy of the gods. This development of ideas necessitates that the pairing of Horus and Seth was familiar at the time of composition of the Pyramid Texts, and that their contrasting is older than Heliopolitan speculation. In certain ancient texts, pairs of gods are mentioned, named the "pair" or "the two lords," who have remained free from such speculations or who were placed together because they belonged to the same district, *e.g.*, "the two lords of the East land" (Sopdu and the falcon god of the eastern middle Egyptian coastland). In these the ancient conditions have been more truly preserved than in the cosmic-astral speculations of the Heliopolitan priests, and in the artificial political division of Horus and Seth between the two realms.

"The two lords in the royal titulary: The term *nbwy* is the titulary of Zoser, with the same meaning as *nbty*, and the Ist dynasty queen's title of *Sm³wt nbwy* ( ) as variant for show that the idea of two male protective deities of the kingdom goes back to the time immediately after the union. The title "She who sees Horus and Seth" shows that at least one interpretation consisted of Horus and Seth. in the titulary of Miebis must also be read *nbwy*, and is a purely ideographic writing of the phonetic . It is obvious that already in the Ist dynasty two theological theories existed side by side: in one, a pair of falcon gods were protective deities of the two halves of the realm, and in the other Horus and Seth were utilised for the same purpose. The process of theological theory may be assumed to have been as follows: The falcon god of Hieraconpolis-Nechen, pressed back by Seth from the position of national god of Upper Egypt, found refuge as Horus of Pe as the national god of Lower Egypt in place of an older heron god. This unnatural construction would explain the anomalous precedence of the

assumed representative of Lower Egypt in the titulary . The most widely-spread modern theory accounts for this phenomenon by assuming that a southern kingdom of Seth was overcome by a northern kingdom, and that the supremacy of Horus originated then (*i.e.*, before the time of the prehistoric "worshippers of Horus"), and points to the title as "Horus over the Ombite."

The earliest historical records show the reverse—namely, the falcon god with the vulture goddess of El Kab as protector and helper in the conquest of Lower Egypt. Against the view of an early southern kingdom of Seth is the evolution of the royal titulary in the Ist dynasty, which shows that the status of Seth as a national god of Upper Egypt was fully developed in historical times. The placing of Seth as a god of Upper Egypt is illogical in the position usually held by a representative of Lower Egypt in the titulary, but is due to compromise with the idea of the king as the impersonation of Horus.

A parallel to this development of the falcon gods, the *nbwy*, into Horus and Seth is afforded by the history of the "souls" of the old capitals, and their mode of representation as jackals (Nechen) and falcons (Pe). At the time of the victory of Hieraconpolis, the rivalry for position as protective deity between "Horus" of Nechen and Upuaut of Siut resulted in the adoption of the form of Upuaut by the "souls" of Nechen; the falcon-headed "souls" then found refuge with "Horus" of Pe, the old heron god who had become a Horus.

L. B. Ellis.

L'Agriculture dans l'Ancienne Égypte. F. Hartmann. 8vo. 332 pp. 77 Figs. 1923.

This work is a valuable compilation of nearly all the published material relating to trees and plants, methods of cultivation, kinds of animals, mode of capture, and domestication. The use of the work is greatly helped by the full historical list, subject list of sources, and index. This comprehensive collection is therefore well fitted to be a permanent text book of the subject, and will not be superseded in this generation as a regular work of reference. As we may hope before long to see another edition of it, the correction of some details may be pointed out. The classical stories of the rainlessness of Upper Egypt are exaggerated; a heavy day's rain occurs once in most years, and the provision of gutters on roofs, raintraps in tombs, and choice of positions clear of rain-streams, shows that the risk was known anciently. The classical quotations about the rise of the Nile should be aided by modern statistics. The old story of the fertility of the land depending on fresh deposits is refuted by the luxuriance of the Fayum, where there has been no deposit for two thousand years. More facts and less dependance on books is needed, here and in other passages. The actual rate and depth of Nile deposit should be stated. The flint-using ages would be better left alone than dealt with so vaguely: the well-made flint hoes which are common (*Abyd*, i, xx) are not shown. Reference is needed to Newberry's List of Hawara plants, and Dr. Spanton on the lotus (Ancient Egypt, 1917, I). The yew is quoted as a wood imported for use; the much commoner Cilician pine and plane tree are omitted. The metal hoe is not known in the Vth dynasty, the earliest in the source quoted being of the XIXth dynasty; it has since been found in the IXth–Xth period. On p. 79 the flint figured is not that of the reference, and the great blades

of Hierakonpolis have no agricultural use. There is no toothed sickle named in Job xxiv, 24. No obsidian knife for sacrifice is known in Egypt (p. 80). In water-raising, the Archimedian screw and the treadmill water-wheel should be included. The wine-press frame is of the Ist dynasty (*R. T.*, I, xxiii, 37), as also the pig (*R. T.*, I, xxvi, 60). The use of slate palettes is referred to (p. 237) but denied (on p. 219) in favour of the hopeless idea of bucklers. The pan hollow on every example, and the continuous descent from earlier palettes, should have laid this notion long ago. These points are named, as they are sometimes misunderstood, and they should be observed by those who use this work. With some small additions and corrections it may well take its place as an indispensable handbook.

Les Figurines Funéraires Égyptiennes. By Louis Speleers. 8vo, 188 pp. 41 pls. (Sand, Bruxelles.) 1923.

This is a very detailed study of the variations of the ushabti figures, which will supply curators and collectors with all the means of comparison for specimens. It will thus be a welcome addition to the library of Egyptologists, and the plates give a valuable series of the less usual types. The main novelty is the proposal that the word shabti means *corvéable*; as the corvée was for Osiris, this applies equally to the figure of the deceased or of a serf. The author does not recognise the sharp division of the purpose of the figure, as representing the deceased till the close of the XVIIIth dynasty, and then being immensely multiplied as representing serfs in the XIXth and onward. There is neither any mention of the complete change brought about by the Ethiopian kings in re-establishing the ushabti, and so founding the Saite style, after the miserable decay in the XXIIIrd dynasty.

NOTES AND NEWS.

A preliminary account of the excavations of the British School of Archæology is given on p. 16. The Director, Sir Flinders Petrie, returned in March, and Mr. Brunton remains, with the rest of the staff, to continue the work till the close of the season.

The Annual Exhibition will be open from July 7 to 26, and on the evenings of the 15th and 25th.

The Egypt Exploration Society has resumed work this season, and Professor F. Ll. Griffith has been directing the clearance at Tell el Amarna.

Most important results have been obtained from Mr. Woolley's work at Ur, finding a tablet of Aanni-pudda, a king of the first dynasty of Ur, which began in 4600 B.C. according to the records. The work of Professor Langdon and Mr. Mackay at Kish has reached a king's name of before 3100 B.C., and beneath that are deposits reckoned as having occupied 1500 to 2000 years. The centre of historic interest, and for great results, lies now in Mesopotamia.

A lantern lecture on recent discoveries at Qau will be given by Sir Flinders Petrie, at University College, Gower Street, on Thursday, 15 May, at 2.30, and repeated on Saturday, 17 May, at 3.0; also repeated at annual meeting of British School, on Monday, 19 May, at 5.30.

Admission to these Lectures will be free, without ticket.